Human Centered Target Acquisition and Engagement Methodology

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Problem

- As we move towards more robust simulation of individual dismounted combatants we have a need to consider the human in greater detail, both from the perspective of a target being acquired and as the agent doing the acquiring.

- This requires augmenting the ACQUIRE methodology to represent the integration of sensor data and other perceptual inputs to provide a “mental model” of the individual combatant’s target environment.

Objective

Develop a more complete human centered target acquisition and engagement methodology, with emphasis on the MOUT environment.

The methodology will focus on incorporating perceptual, cognitive and behavioral inputs to provide a significantly enhanced representation of the warfighter's search and target acquisition process.

Scope

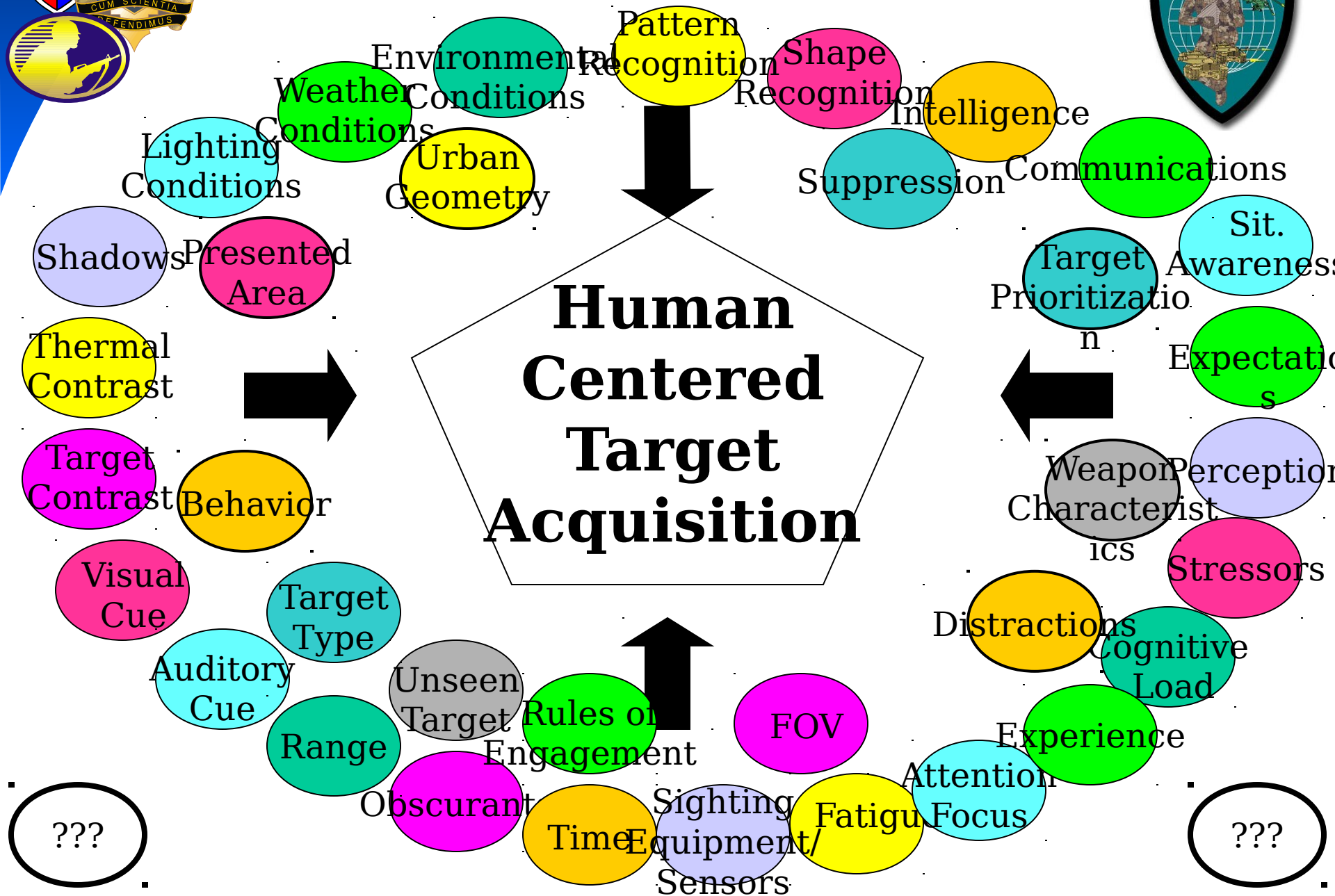
- Will include factors not represented as inputs to engineering models
- Heavily focused on target acquisition portion of the engagement process
- Will provide information on breadth of factors impacting on target acquisition and engagement, and then provide depth on selected key factors

Customers

- MOUT FACT
- Combat Simulations
  - IUSS
  - Combat XXI
  - OneSAF Objective System
  - AIMS
- Hardware Programs
  - Objective Force Warrior Program

Will solicit needs and provide opportunity to participate

Initial List of Factors



Potential Factor Categories

- Cues
- Items that affect attention (limited resource)
- Behaviors to detect and discriminate
- Human / target pairings
  - Can I detect and discriminate targets?
  - Does what I see fit with expectations?
- Sensor characteristics
- Information that affects confidence
- Stressors
- Personal characteristics
- Environmental

Approach

1. Identify the needs of the combat simulations developers.
2. Determine methods of linking to combat simulations.
3. Refine existing factors and identification of additional factors.
4. Conduct SME interviews and review existing literature for linkages.
5. Obtain extant data.
6. Develop a first generation conceptual model.
7. Determine which of the factors are most relevant based upon research findings, needs of and ability to link with identified combat simulations, and available data.
8. Update conceptual model.

Approach

9. Begin to populate the model.
10. Identify areas where data / linkages may be lacking
11. Obtain or develop test methodologies needed to collect additional data.
12. Collect additional data.
13. Adjust model as appropriate.
14. Develop computer code and API's.
15. Validate the algorithms and model.
16. Document and provide findings, algorithms, data structures, software code and API's.

Key Partners

- Natick Soldier Center – Project management, camouflage research, expertise of human system & data collection
- NVESD – S&TA expertise, data, experimentation support
- ARL-HRED – expertise of human system, experimentation support, link to SA STO
- AMSAA – S&TA expertise & V&V Support
- Simulation Technologies Inc. (STI) – architecture and code development

Key Partners

- Infantry Center – Real world SME input
- PEO-STRI – knowledge of combat simulation requirements, architecture and processes
- TRAC-WSMR - knowledge of combat simulation requirements, architecture and processes
- U.K. MoD – U.K. perspective
- Others are TBD

Other Leveraging

- SBIR on Individual Combatant Weapons Engagement being led by Natick and conducted by SOAR Technologies
- Warrior Systems Modeling Technology STO
- Human Science Data for Modeling and Simulation Effort being led by Natick

Deliverables

- List of Needs from Developers
- List of Identified Factors
- Conceptual Architecture Linking Factors
- Data Activities
- Work in Progress Updates
- Briefings
- Software Codes
- Written Research Results & Links

HCTA-CE Website

To support the HCTA-CE effort to more readily gather commentary and feedback, a website (http://natick.stiusa.com/hcta/) has been established. The website will allow the posting and downloading of materials, feedback, and exchange of comments between all participants. The website will be password protected.

Schedule

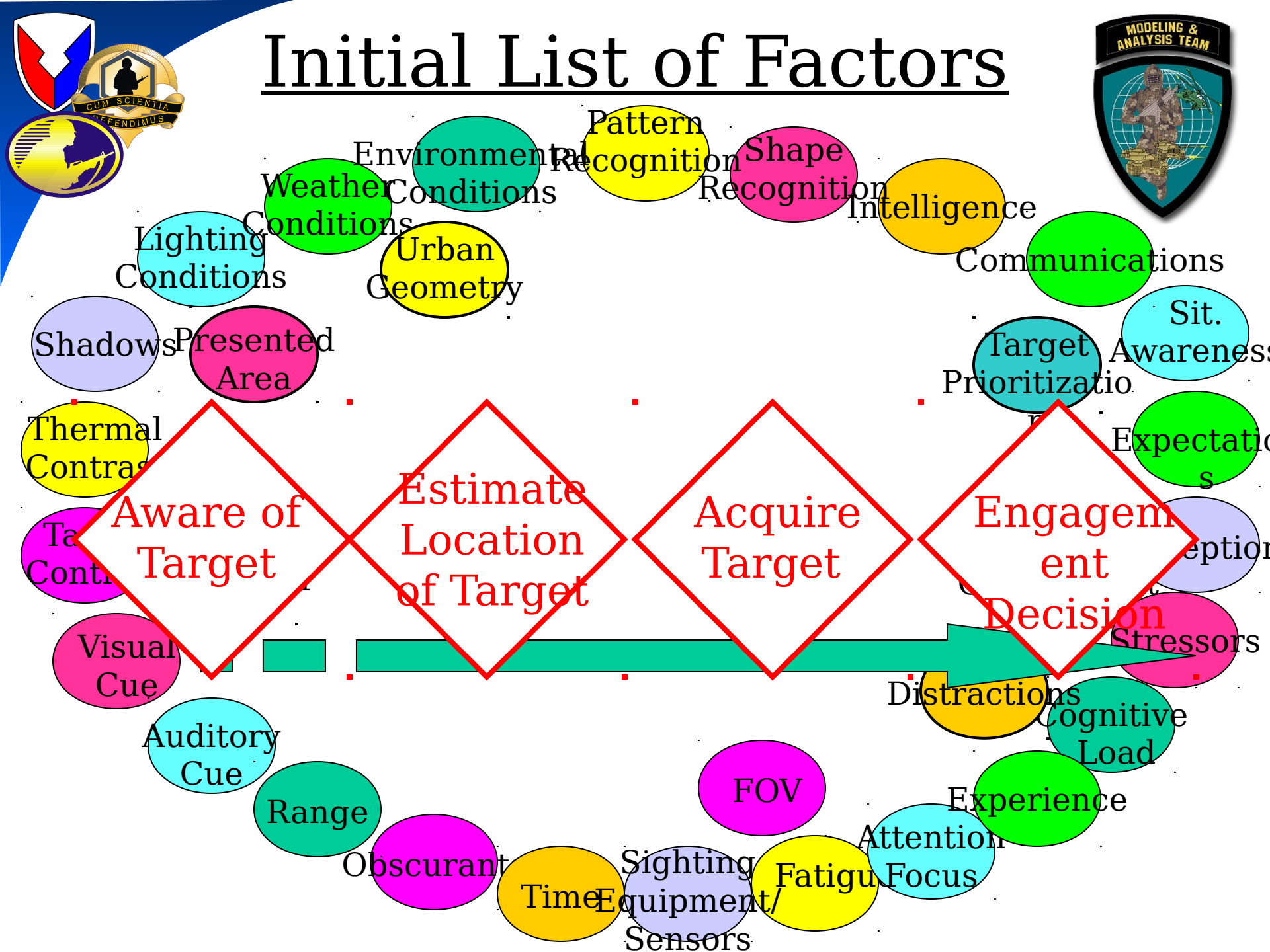
Milestones	3Q03	4Q03	1Q04	2Q04	3Q04	4Q04	1Q05
Identify the needs of the combat simulations developers							
Determine methods of linking to combat simulations							
Conduct SME interviews and review existing literature for linkages							
Refine existing factors and identification of additional factors							
Obtain extant data							
Develop a first generation conceptual model							
Determine which of the factors are most relevant based upon research findings, needs of and ability to link with identified combat simulations, and available data							
Develop an updated generation conceptual model							
Begin to populate the model							
Obtain or develop test methodologies needed to collect additional data							
Collect additional data							
Adjust model as appropriate							
Develop computer code and API's							
Validate the algorithms and model							
Document and provide findings, algorithms, data structures, software code and API's							

Back-ups

Initial List of Factors (cont'd)

Environmental Conditions	Experience
Urban Geometry	Distractions
Weather Conditions	Experience
Lighting Conditions	Cognitive Load
Presented Area	Stressors
Shadows	Weapon Characteristics
Thermal Contrast	Perception
Target Contrast	Expectations
Visual Cue	Sit. Awareness
Auditory Cue	Target Prioritization
Range	Communications
Behavior	Intelligence
Obscurants	Shape Recognition
Time	Pattern Recognition
Sighting Equipment/Sensors	Fatigue
Target Type	Suppression
Unseen Target	Rules of Engagement
FOV	Attention Focus

Initial List of Factors



Initial List of Factors (cont'd)